

# ATOMIC ENERGY

*the power*

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Dear Sir:

Authority for the five-member U. S. Atomic Energy Commission to hire or discharge the general manager of the AEC, and to fix his salary, was incorporated in a bill originating in the Joint Congressional Committee on Atomic Energy, and sent to Congress last week. (The bill had been requested by Gordon E. Dean, new AEC Chairman. His action followed recent resignation of Carroll L. Wilson, AEC's general manager since 1947, after a dispute over whether the general manager or the Commissioners should run the atomic program.) Now, the general manager is a semi-independent official, appointed by the President. Under the proposed legislation, he would be directly under the Commissioners.

A Conference on Electronic Instrumentation in Nucleonics and Medicine, and a nucleonic manufacturers' exhibit, will be held in New York, Oct. 23-25, at the Park Sheraton Hotel. Sponsored jointly by the Institute of Radio Engineers, and the American Institute of Electrical Engineers, this will be the third such annual session and exhibit. First day of the session will be devoted to the medical aspects of the subject; the second and third days to nucleonics.

An atomic bomb shelter, to be built into the sub-basement of a projected 21 story office building in New York (260 Madison Ave.) is believed the first recognition by metropolitan builders that such protection is needed in that area. Supports of the shelter will be so designed that they will withstand a complete collapse of the building above it. To be about 24,000 square feet in size, the shelter is planned for 4,000 people, estimated as the maximum number of tenants and visitors that may be in the building at any one time. Blowers will be provided to exhaust from the shelter any initially deposited contamination, in the event of an atomic bombing, while special emergency exits to permit free movement, should regular exits be blocked, are part of the disaster planning.

Contract has now been given the American National Red Cross, by the AEC, under which improved methods, for separating and preserving blood components of interest in atomic energy research, will be sought by the Red Cross. Primary interest of the AEC in blood fractionation studies is the development of means for separation and preservation of white cells and platelets, the two blood components of particular value in combating acute radiation effects. In its initial studies, under this contract, however, the Red Cross will administer engineering development of new and quicker methods for obtaining and preserving plasma and red blood cells.

An International Nuclear Physics Conference, sponsored by the Atomic Energy Research Establishment, Harwell, will be held at Harwell and Oxford Sept. 7-13. The conference will be in two parts, the first concerned primarily with the use of high energy particle accelerators for nuclear physics experiments; and the second with lower energy nuclear physics.

AT THE ATOMIC CITIES & CENTERS IN THE UNITED STATES...

ARCO, Idaho- To construct the main building which will house the submarine thermal reactor here, F. H. McGraw & Co., Hartford, Conn., have submitted a low bid of \$1,247,000.00. It was the lowest of three; others came from Ragnar, Benson, Inc., Chicago, and M. J. Brock & Sons, Los Angeles. The work, which comprises a main building and associated facilities, will be done under sub-contracts to Westinghouse Electric, with approval of the AEC. Plans and specifications for this construction were prepared by Rust Engineering Co., Pittsburgh, under an architect-engineer contract awarded by Westinghouse last February. Design of the two remaining principal buildings will be completed by Rust in September, when invitations to bid on their construction will be publicly advertised.

This submarine thermal reactor, first model (Mark-I) of which will be a land-based prototype, and for which the external building will soon be constructed (as above), is now being developed jointly by Argonne National Laboratory, Chicago, and Westinghouse Electric Co., Pittsburgh. Expediting activities is the working level liaison which has been established between Westinghouse, Argonne, the Navy's Bureau of Ships, and the Electric Boat Co., Groton, Conn. (now making preliminary studies on the subject). Correlation of data by these agencies, on machinery, hull requirements and limitations, is underway. The sum of \$26,000,000.00 has been allocated this project in the AEC's 1951 fiscal year budget. (Meanwhile, at the General Electric-operated Knolls Atomic Power Laboratory, work is being done on a submarine nuclear reactor in the intermediate region of neutron energies; the Westinghouse-Argonne reactor will operate in the region of slow, or thermal, neutrons.)

OAK RIDGE, Tennessee- A \$7,374,000.00 sub-contract, for construction of an electrical sub-station, to serve the new K-31 gaseous diffusion plant for uranium-235 production, has been awarded the Gustav Hirsch Organization, Inc., Columbus, Ohio. Contract was awarded by Maxon Construction Co., Dayton, Ohio., prime contractor for the building of K-31 and K-29, new units for uranium-235 production; Hirsch bid was the lowest of seven made. (Subsequently, Hirsch awarded sub-contract for the buildings to Traylor Bros., Evansville, Ind., on a bid of \$1,179,000.00.) In addition to Gustav Hirsch, other principal firms building the facilities under Maxon include Edenfield Electric, Inc., Nashville, Tenn., who are doing all the electrical work on K-29 and K-31 with the exception of this \$7 million sub-station) and Kaighin & Hughes, Inc., Toledo, Ohio, handling all mechanical work. Edenfield's contract involves approximately \$30,000,000.00, while the Kaighin & Hughes contract approximates \$48,000,000.00. Giffels & Vallet, Inc., Detroit, are architect-engineers for the building of the new production units. Sargent & Lundy, Chicago, are designing the sub-station. Carbide & Carbon Chemicals Division, of Union Carbide & Carbon, are doing process development and design for both K-29 and K-31, and are also procuring the special production equipment and materials needed. Upon completion, the plants, which will greatly increase output of U-235, will be operated by Carbide; contracts have already been let. The K-29 project will cost approximately \$66,000,000.00; the K-31 plant, \$162,000.00.

Operations at K-29 and K-31 will be coordinated with the older K-25, all utilizing uranium hexafluoride as the feed. The essential cells and cascade elements for K-31 are the same as those for K-29; the cells will be put into operation as they are completed, so that a portion of the capacity can be utilized to make U-235 before the entire job is finished. Target date for completion is the Summer of 1951. Personnel of K-25 have already been assigned new jobs in preparation for K-29 & K-31 operations; although there will be a great number of technical improvements, new plant procedures will be similar to those presently in effect.

Devoted to modern physical chemistry, the second annual Summer symposium, sponsored jointly by Oak Ridge National Laboratory, and Oak Ridge Institute, of Nuclear Studies, has attracted an attendance of over 150 persons from 37 colleges, universities, and industrial organizations. First symposium, last Summer, was in modern physics.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

An appropriation of \$1,853,000.00 has been made available by the Board of Estimate of the City of New York to its civil defense director, Arthur W. Wallander, for the purchase of apparatus and supplies to cope with an atomic bombing of that City. Included was an item of \$50,000.00 which will be used to buy Geiger counters. Mr. Wallander told the Board that ultimately he would need \$41,000,000.00 to complete his preparations.

For the first time, a semi-annual report of the U. S. Atomic Energy Commission (8th Report: July 1950) has included a listing of manufacturers of nuclear measurement equipment and allied devices (which are made for the AEC). Approximately 78 are so listed.

A special slide rule for computing radioactivity decay factors has been devised by J. L. Herson, of the Radioactivity Laboratory, National Bureau of Standards, Washington, D. C. It has been found by the Bureau to be an effective time saver when many computations of decay factors are involved. The slide rule includes two scales laid off side by side and properly chosen to provide a graphic computation of the relationship expressed in the usual decay-correction formula.

RAW MATERIALS...radioactive ores & other essentials for nuclear work...

UNITED STATES- Moab, Utah: Consolidated Uranium Mines, Inc. has now acquired properties in Emery county, Utah, including the interests of Continental Mining & Milling Co. who have been producing and marketing uranium ores. Consolidated has also acquired control of properties south of Moab formerly owned by the Vanadium Corp. of America, and expect to begin active operations there shortly....Recently formed Climax Uranium Co. (joint endeavor of Climax Molybdenum and Minerals Engineering Co.) has reported "good progress" on its Grand Junction, Colo., uranium ore mill. Transfer was recently made to Climax Uranium of 141 uranium-vanadium claims, formerly owned by Minerals Engineering ....A group of California prospectors have staked 14 uranium ore claims about 37 miles southeast of Yerington, in southern Lyon county, Nevada. One of the prospectors, Warren Loose, of Chico, Calif., has stated that the ore was found to contain pitchblende.

CANADA- The Lake Athabaska uranium fields continue to be marked by intensive exploratory activity. Athona Mines, Ltd., with Goldcrest, have started work on discoveries made last year at Ace Lake. Investigations also will be started by Athona at its Ath group, at Ragg's Lake, at the east end of Eldorado's holdings. Efforts will be directed at determining the source of the radioactivity located through overburden....Three of the 11 showings of Baska Uranium Mines, Ltd., have revealed pitchblende, the company's geologist has reported. Other Baska showings are under active exploration....Conwest Exploration Co., Ltd., American Yellowknife Mines, Ltd., Athlodge Uranium Mines Ltd., and Beta Gamma Mines, Ltd., are other companies in various stages of exploratory work on their concessions here.

SOUTH AUSTRALIA- The Director of Mines of this State, S. B. Dickinson, will visit the United States, Canada, and Great Britain in connection with the exploitation of uranium minerals in Adelaide. An assessment of the commercial value of the Radium Hill uranium mineral deposits, in Adelaide, are his objectives.

FRANCE- The pitchblende seam uncovered and being worked at La Crouzille, in the Haute Vienne, about 15 miles northeast of Limoges, is proving satisfactory, Professor Roubault, of the French Atomic Energy Commission, has stated. He said the ore found here is more easily worked than that at Puy-de-Dome, another uranium ore source now being utilized.

OCCUPIED GERMANY & POLAND- Further details on the activities of Wismuth, A. G., most important unit in the organization set up by the Soviet Union to exploit uranium minerals, have now been compiled by the British Control Commission for Germany. (See AEN 8/30/49, p.5 "Intensive uranium ore mining activities by Wismuth A.G.") The British report states that prospecting activities have been conducted in approximately 250 communities in eastern Germany by this organization.

IONIZING RADIATION...investigations & notes...

Experiments to determine the effects of testosterone propionate on mice irradiated with x-rays have been carried out by Friedrich Ellinger, of the Naval Medical Research Institute, at Long Island College of Medicine, N.Y. Ellinger exposed Swiss mice to x-ray dosages of 500r/air, in one exposure only. Administration of testosterone propionate, in daily doses of 0.25 and 0.5 mg following the exposure, up to 14 days, was found to markedly increase the lethal effect of the irradiation. However, no changes occurred in the x-ray induced organ effects, with the exception of the liver. Radiation-induced accumulation of sudanophile fat, in this organ, was definitely suppressed with larger doses of testosterone.

Changes in number and characteristics of free tumor cells after intra-peritoneal injection of radioactive iodine have been investigated by H. Goldin and P. F. Hahn, of the Cancer Research Laboratories, Meharry Medical College, Nashville, Tenn. In the work, mice were injected intraperitoneally with sarcoma cells, and treated (intraperitoneally) with radioactive iodine (I-131) in doses of 0.2 or 0.4 mc. The fate of the tumor cells was studied by repeated withdrawal and examination of peritoneal fluid in each mouse, and compared with their fate in control animals which were inoculated with the same dose of cells, but untreated, or treated with decayed I-131. The results indicated that, with a single exception, all tumor cells suffered loss of viability even after treatment with the minimal dose (0.2) of I-131.

The modification of resistance to ionizing radiation by humoral agents has been investigated by J. B. and R. M. Graham, of the Department of Surgery, University of Oregon Medical School, Portland, Oregon. Experiments were made on Swiss mice which were exposed to total body x-irradiation. A number of substances, including horse serum, stilbestrol, estradiol, estrone, testosterone, and adrenal cortical extract, given either ten days before, or immediately after exposure to x-rays, were found to effect the mortality rate. Both the time of administration, as well as the substance, determined the effect produced by the agents. The Grahams note that a variety of substances, including stilbestrol, and some steroids, have been found to induce a cellular response in animals closely resembling that produced by radiation. Since this suggests that these materials, and radiation, have a similar effect on the organism, it may explain the ability of these agents to modify resistance to radiation.

ATOMIC PATENT DIGEST...latest U. S. & British applications & grants..

Eye applicator, for applying radiation from radioactive substances to an eyeball. Comprises a hollow casing with an open front side, and bounded by an eye-contacting edge which is so curved as to be complementary to the sphericity of the eyeball. The casing forms a housing for radioactive material. U. S. Pat. No. 2,517,568, issued Aug. 8, 1950; assigned to Radium Chemical Co., New York.

Amplification system for non-contacting thickness gauges. In a thickness gauge using as its measuring agent a constant beam of sub-atomic particles impinging upon a detector thereof, and having means to modulate periodically the particle density of this beam, to produce an alternating signal voltage output, an alternating current amplifier for this alternating signal voltage. U. S. Pat. No. 2,518,115, issued Aug. 8, 1950; assigned to General Electric Co., Schenectady, N. Y.

Radiation counter. A fast neutron counter comprising spaced electrodes and a plurality of hydrogenous wafers dividing the space between these electrodes into several ionization regions. U. S. Pat. No. 2,519,007, issued Aug. 15, 1950; assigned to the United States of America (USAEC).

Geiger-Mueller counter tube. A gas mixture for the filling of G-M tubes for the purpose of providing such tubes with self-quenching properties with pulse equalization at substantially atmospheric internal gas pressure. U. S. Pat. No. 2,519,864, issued Aug. 22, 1950, to Paul B. Weisz, Swarthmore, Pa.

ATOMIC ENERGY WORK ABROAD...Great Britain...

The major part of the work at the Atomic Energy Research Establishment, Harwell, has been to provide information to the atomic energy production organization which operates the plutonium piles and the chemical separation plant at Windscale Works, Cumberland. Although the chemistry, chemical engineering, and metallurgy divisions have devoted the larger portion of their efforts to this task, design studies on experimental reactors for power purposes have received some attention, while output of radioactive isotopes has been constantly increasing.

In the Chemical Engineering Division, at its minerals dressing laboratory, economic and proper methods of extraction of uranium from low-grade ores are sought. Studies are also conducted on such materials for nuclear reactors as graphite, beryllium, and beryllia, which may be used as moderators. To work with the very toxic beryllium, a special laboratory has been built. This Division also does development work on such methods of chemical separation as ion exchange, solvent extraction, and chemical exchange. The work is applicable to such problems as the separation of plutonium from uranium which has been pile-irradiated; for the separation of radioactive fission products; and to separate hafnium from zirconium to produce pure zirconium metal for new reactors.

At the new radiochemistry laboratory, emphasis is on research into methods of separating plutonium and fission products from uranium metal that has been irradiated in a pile. Both this laboratory, and the chemical engineering division, have made pilot plant studies on the methods which will be used in the full-scale production plant. Here at this laboratory attention has been devoted to the chemical problems associated with piles and reactors, especially to such subjects as the effect of radiation on the chemical reactivity of pile materials.

Activities of the Metallurgy Division include basic researches into diffusion in metals, effects of irradiation on solids, and heavy-element alloy theory. The properties of uranium alloys are being systematically studied; it is hoped that alloys with better chemical, physical, and mechanical properties than the pure metal will be found as a result of these researches.

The larger of the two experimental piles at Harwell, the British Experimental Pile (BEPO), started up in July, 1948, but was not in full operation until early 1949. In addition to producing radioisotopes, the pile is being used for experiments in nuclear physics, and in radiation chemistry. Work is also being done with it on materials of importance in the reactor program. The nuclear physics research (with the pile) encompasses studies of nuclear properties of reactor materials, including nuclear fuels, as well as investigations of nuclear reactions for isotope production.

Construction of experimental reactors for the production of useful power are now being considered by the government. With a background of two years experience with the Harwell pile, and after design studies had been made, a program was formulated at Harwell. The major problems are the economical extraction of uranium from low grade ores; development of nuclear reactors which will burn a higher proportion of the initial charge of uranium metal than will existing reactors; and to find suitable materials which will withstand the higher temperatures needed for most economic use of the heat produced. Facilities for studying these problems include a Van de Graaff machine, and linear accelerator, and are providing certain basic information as a foundation for this program. Also under study are liquid metals suitable for the high transfer rates that will be required, as well as problems of circulating them in closed circuits. The Metallurgy Division has made encouraging progress in the production of beryllium shapes, as a possible new reactor material.

Sincerely,

The Staff

ATOMIC ENERGY NEWSLETTER